



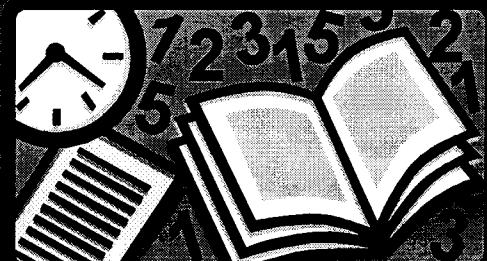
Microbial Threats to Health in the United States

Prof. Joshua Lederberg
Raymond and Beverly Sackler Foundation Scholar
Suite 400 (Founders Hall)
The Rockefeller University
1230 York Avenue
New York, NY 10021-6399



Objectives:

- To demonstrate the importance of public health measures in combating the disease
- To review some of the historical threats to health and newly emerging infections
- Addressing the threats
- Recognition
- Intervention



Public Health and Sanitation

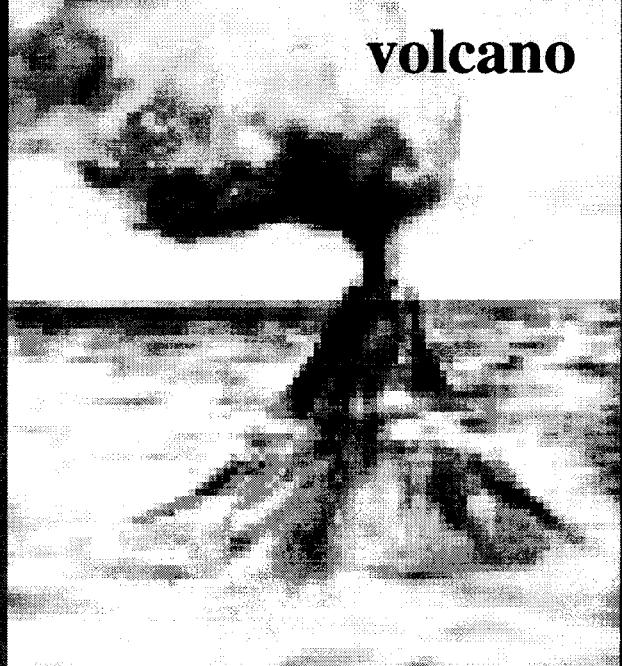
Achievements of the 20th century:

- Improvements in hygiene practices
- Improvements in food handling (refrigeration)
- Improvement in Water and sewage treatment
- Vaccination practices



volcano

Alone or in combination, economic collapse, war, and natural disasters, among other societal disruptions, have caused (and could again cause) the breakdown of public health measures and the emergence or reemergence of a number of deadly diseases

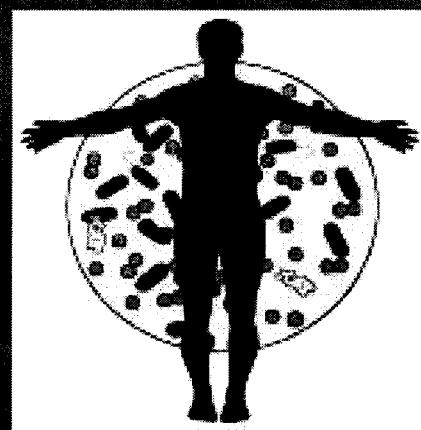


The threat of bioterrorism still exists

"The cold reality is that it is almost impossible to enforce the existing biological weapons treaty. There is no biological weapons facility, which if shut down today could not be rebuilt tomorrow,"

<http://news-service.stanford.edu/news/january21/lederberg.html>

Several bacteria and viruses head the list of potential biological warfare agents, including anthrax, smallpox, plague, botulism, tularemia, glanders (from CDC website).



What is bioterrorism?

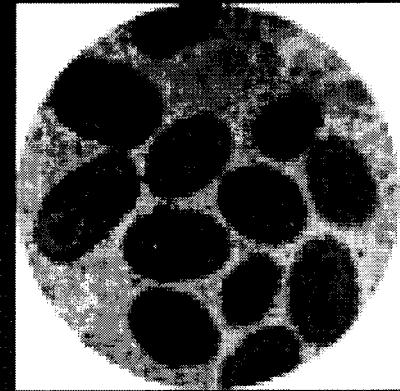
Dispersal of microbes or their toxins to produce illness, death and terror

Biological warfare is the use of agents of disease for hostile purposes

Biological weapons

Biological weapons are characterized by low cost and ease of access; difficulty of detection, even after use until disease has advanced; unreliable but open-ended scale of predictable casualties, and clandestine stockpiles and delivery systems

Smallpox



A systemic viral disease characterized by fever and the appearance of skin lesions, smallpox is believed by some to have been responsible for the death of more people than any other acute infectious disease.

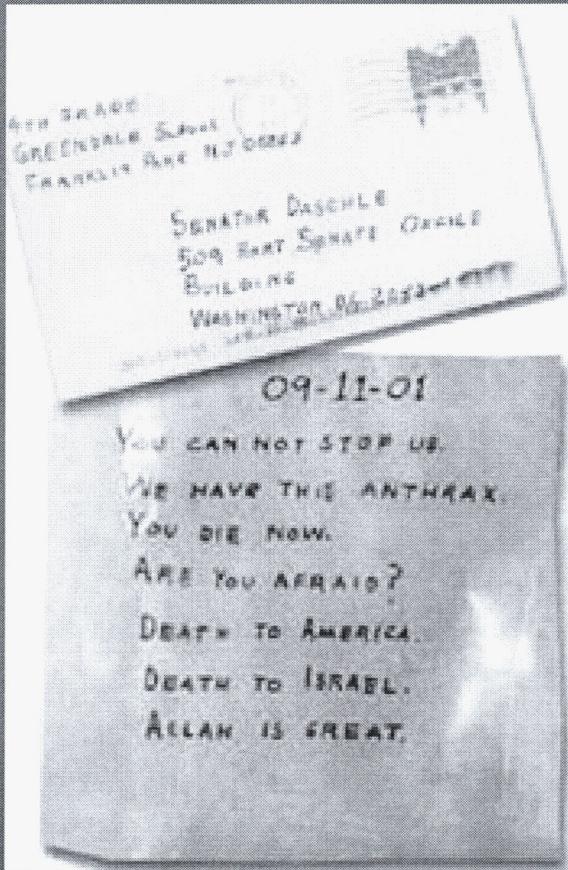
Newly emerging conditions: Anthrax

acute infectious disease caused by the spore-forming bacterium *bacillus anthracis*

- most commonly occurs in wild and domestic animals including cattle, sheep, goats, camels, antelopes and other herbivores



Newly Emerging Conditions: Anthrax



- May naturally occur in humans when they are exposed to infected animals or tissue from infected animals.
(MRO today)
- Anthrax can be used as the bioterrorism agent

Anthrax is misunderstood in one respect: it's not a contagious disease, and wouldn't spread the way smallpox would. In that sense people are more frightened of anthrax than is warranted. However, for a sophisticated attacker, anthrax is lamentably a very good agent.

<http://praxis.md/post/friendlyfire/071200/1>

Is there a treatment for anthrax?

Administration of appropriate antibiotics can protect the majority of those exposed to the agent



Risk of dying

Smoking 10 cigarettes a day	One in 200
Road accident	One in 8,000
Playing soccer	One in 25,000
Homicide	One in 100,000
Terrorism attack in 2001	One in 100,000
Hit by lightning	One in 10,000,000
Terrorism attack in 1990's	One in 50,000,000
Anthrax in 2001	One in 50,000, 000
Smallpox in 2001	None

Is bioterrorism something new?

Example: Use of
bioterrorism
tactics in the
14th century
by Mongol army



Addressing the threats Recognition

The key to recognizing new or emerging infectious diseases, and to tracking the prevalence of more established ones, is surveillance.

What is Surveillance?

Etymology: French, from *surveiller* to watch over, close watch kept over someone or something (from “Webster.com”)

How can grade school children help with bioterrorism surveillance?

- Notify teachers and parents if somebody or something looks suspicious
- Learn more about bioterrorism and do not give in to panic
- Share the knowledge about bioterrorism with friends

Addressing the threats Intervention

The response to an emerging infectious agent or disease necessitates coordinated efforts by various individuals, organizations, and industries (vaccine development, vector control, continued research, education of the public, etc)

The Need for New Data....and new research

Data are the building blocks of knowledge and the seeds of discovery. They challenge us to develop new concepts, theories, and models to make sense of the patterns we see in them.

